Visual Aids for Exploratory Data Analysis

November 27, 2024

1 Visual Aids for Exploratory Data Analysis

In this chapter we are going to learn about different visualization techniques using simpler data set.

[32]:
```
!pip install faker
!pip install radar
```

```
Requirement already satisfied: faker in
/home/test/anaconda3/envs/pandas/lib/python3.12/site-packages (33.0.0)
Requirement already satisfied: python-dateutil>=2.4 in
/home/test/anaconda3/envs/pandas/lib/python3.12/site-packages (from faker)
(2.9.0.post0)
Requirement already satisfied: typing-extensions in
/home/test/anaconda3/envs/pandas/lib/python3.12/site-packages (from faker)
(4.11.0)
Requirement already satisfied: six>=1.5 in
/home/test/anaconda3/envs/pandas/lib/python3.12/site-packages (from python-
dateutil>=2.4->faker) (1.16.0)
Requirement already satisfied: radar in
/home/test/anaconda3/envs/pandas/lib/python3.12/site-packages (0.3)
```

[33]:
```
from faker import Faker
fake = Faker()
```

[34]:
```
import datetime
import math
import pandas as pd
import random
import radar
```

[35]:
```
import datetime
import math
import pandas as pd
import random
import radar
from faker import Faker
fake = Faker()
```

```
def generateData(n):
  listdata = []
  start = datetime.datetime(2019, 8, 1)
  end = datetime.datetime(2019, 8, 30)
  delta = end - start
  for _ in range(n):
    date = radar.random_datetime(start='2019-08-1', stop='2019-08-30').
↪strftime("%Y-%m-%d")
    price = round(random.uniform(900, 1000), 4)
    listdata.append([date, price])
  df = pd.DataFrame(listdata, columns = ['Date', 'Price'])
  df['Date'] = pd.to_datetime(df['Date'], format='%Y-%m-%d')
  df = df.groupby(by='Date').mean()

  return df
```

2 Line Chart

A line chart is used to illustrate the relationship between two or more continuous variables.

[36]:
```
df = generateData(50)
df.head(10)
```

[36]:
```
                 Price
Date
2019-08-01  938.153150
2019-08-02  933.626500
2019-08-03  931.017067
2019-08-05  971.359850
2019-08-06  930.940833
2019-08-07  957.550150
2019-08-08  914.467800
2019-08-09  930.912100
2019-08-10  990.557000
2019-08-11  927.328450
```

[37]:
```
df.to_csv(r'stock.csv')
```

2.1 Steps Involved

1. Load the dataset and prepare the dataset. We will learn more how we can prepare the data in the chapter 4, data transformation. For this exercise, all the data are pre-processed.
2. Import the matplotlib library. It can be done simply by:

```
import matplotlib.pyplot as plt
```

3. Plot the graph.

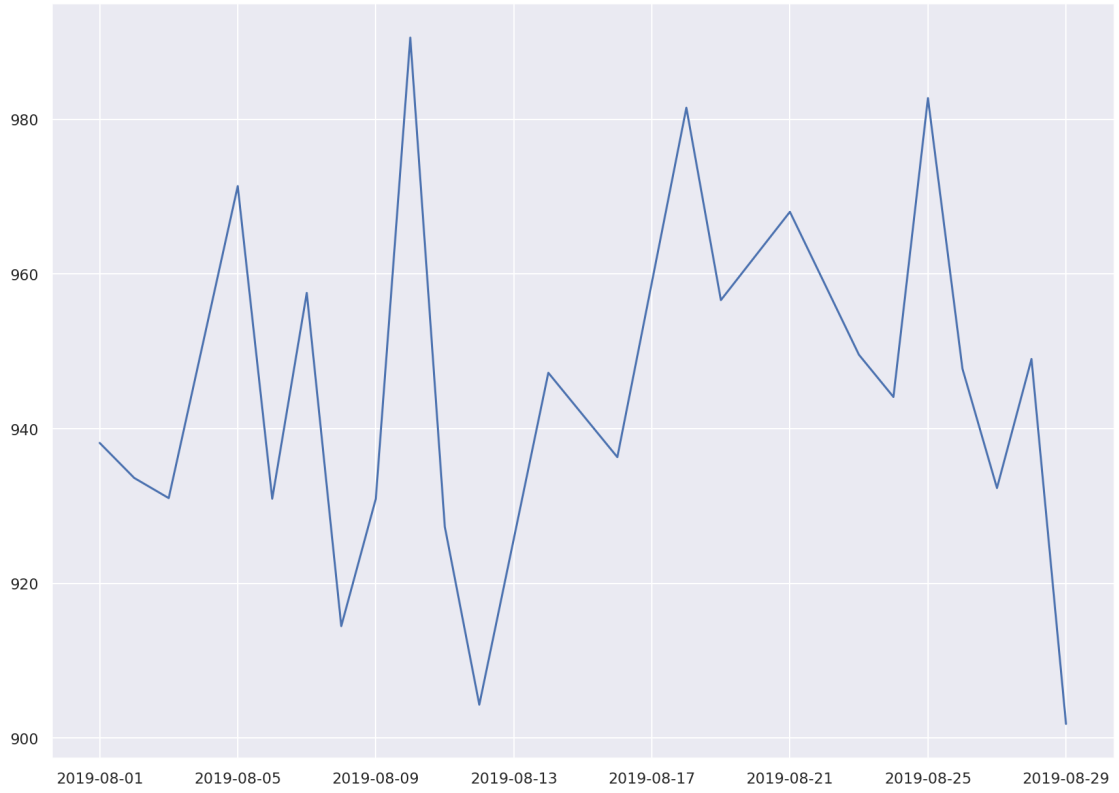
```
plt.plot(df)
```

4. Display on the screen.

```
plt.show()
```

[38]:
```
import matplotlib.pyplot as plt

plt.rcParams['figure.figsize'] = (14, 10)
plt.plot(df)
```

[38]:
```
[<matplotlib.lines.Line2D at 0x72528e18f0e0>]
```

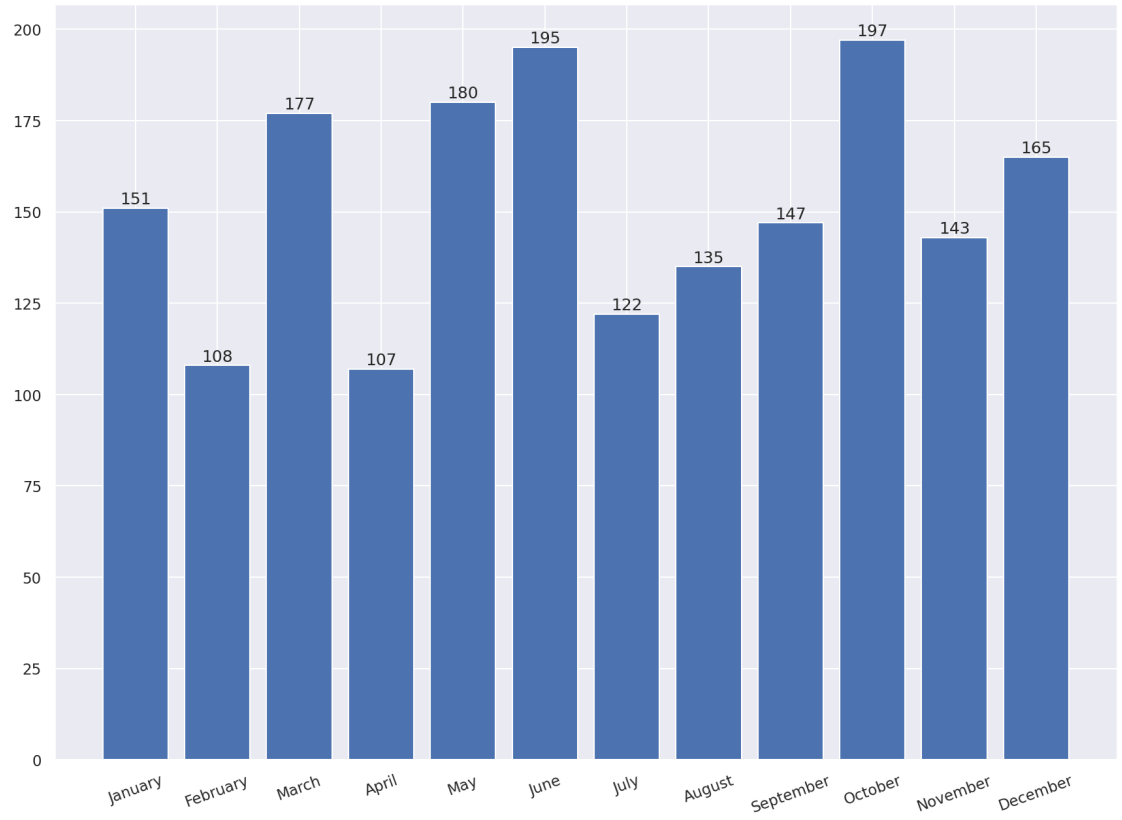


3 Bar Chart (Plots)

Bars can be drawn horizontally or vertically to represent categorical variables. Bar charts are frequently used to distinguish objects between distinct collections in order to track variations over time. In most cases, bar charts are very convenient when the changes are large. if you want to show ranking, an ordered bar chart would be a good choice.

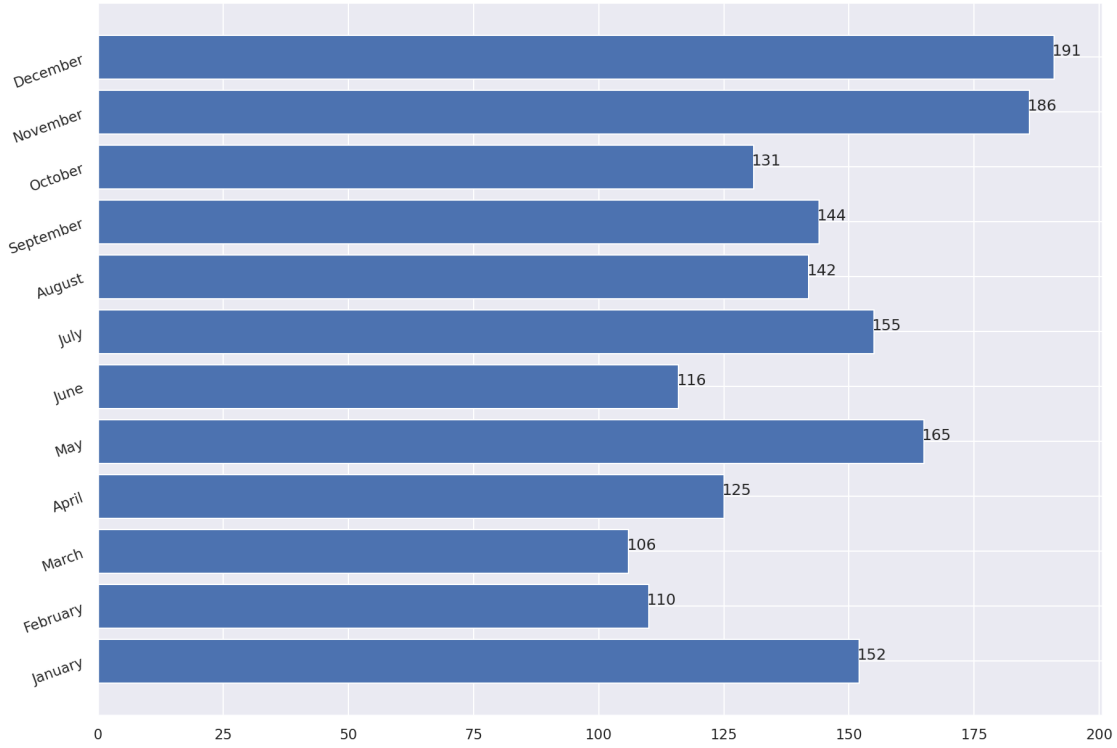
[39]:
```
# Let us import the required libraries
import numpy as np
import calendar
```

```
import matplotlib.pyplot as plt

# Step 1: Set up the data. Remember range stoping parameter is exclusive.␣
 ↪Meaning if you generate range from (1, 13), the last item 13 is not included.
 ↪
months = list(range(1, 13))
sold_quantity = [round(random.uniform(100, 200)) for x in range(1, 13)]

# Step 2: Specify the layout of the figure and allocate space.
figure, axis = plt.subplots()

# Step 3: In the X-axis, we would like to display the name of the months.
plt.xticks(months, calendar.month_name[1:13], rotation=20)

# Step 4: Plot the graph
plot = axis.bar(months, sold_quantity)

# Step 5: This step can be optinal depending upon if you are interested in␣
 ↪displaying the data vaue on the head of the bar.
# It visually gives more meaning to show actual number of sold iteams on the␣
 ↪bar itself.
for rectangle in plot:
  height = rectangle.get_height()
  axis.text(rectangle.get_x() + rectangle.get_width() /2., 1.002 * height, '%d'␣
 ↪% int(height), ha='center', va = 'bottom')

# Step 6: Display the graph on the screen.
plt.show()
```



[40]:
```
# Step 1: Set up the data. Remember range stoping parameter is exclusive.
 ↪Meaning if you generate range from (1, 13), the last item 13 is not included.
 ↪
months = list(range(1, 13))
sold_quantity = [round(random.uniform(100, 200)) for x in range(1, 13)]

# Step 2: Specify the layout of the figure and allocate space.
figure, axis = plt.subplots()

# Step 3: In the X-axis, we would like to display the name of the months.
plt.yticks(months, calendar.month_name[1:13], rotation=20)

# Step 4: Plot the graph
plot = axis.barh(months, sold_quantity)

# Step 5: This step can be optinal depending upon if you are interested in
 ↪displaying the data vaue on the head of the bar.
# It visually gives more meaning to show actual number of sold iteams on the
 ↪bar itself.
for rectangle in plot:
  width = rectangle.get_width()
```

```
  axis.text(width + 2.5, rectangle.get_y() + 0.38, '%d' % int(width),␣
 ↪ha='center', va = 'bottom')

# Step 6: Display the graph on the screen.
plt.show()
```



4 Scatter Plots

They use a Cartesian coordinates system to display values of typically two variables for a set of data. Scatter plots can be constructed in the following two situations:

1. When one continuous variable is dependent on another variable, which is under the control of the observer
2. When both continuous variables are independent

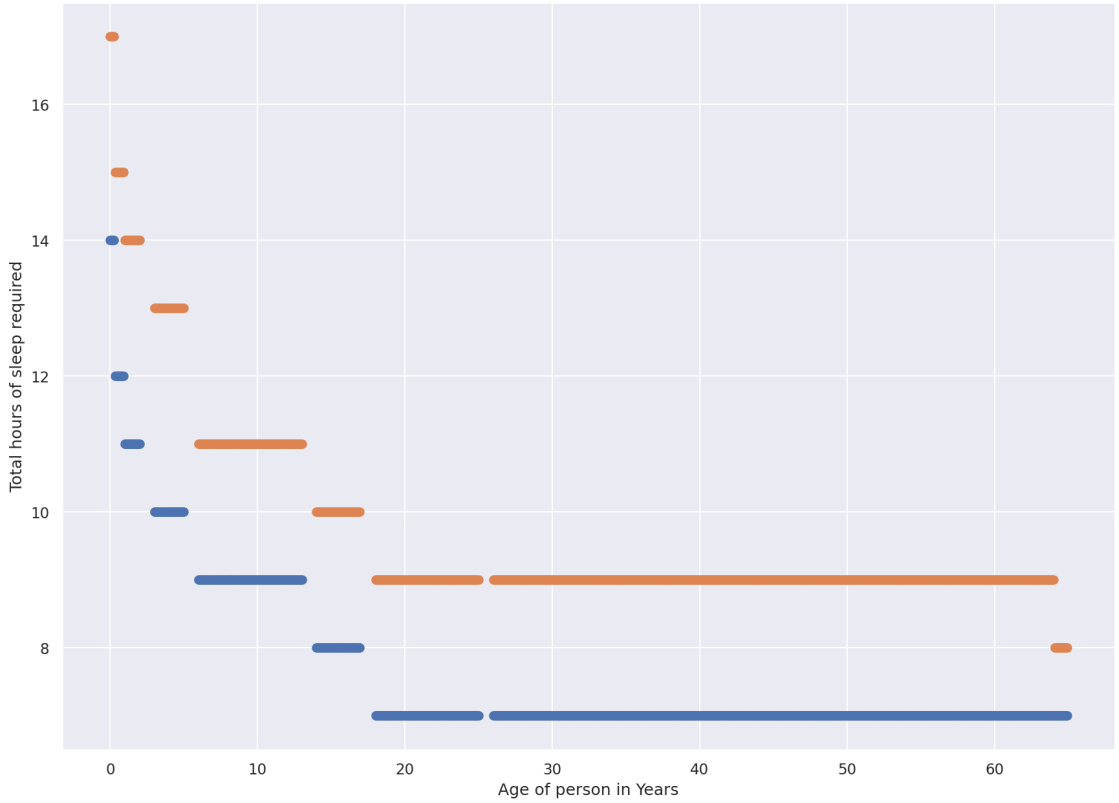
[41]:
```
age = list(range(0, 65))
sleep = []

classBless = ['newborns(0-3)', 'infants(4-11)', 'toddlers(12-24)',␣
 ↪'preschoolers(36-60)', 'school-aged-children(72-156)', 'teenagers(168-204)',␣
 ↪'young-adults(216-300)','adults(312-768)', 'older-adults(>=780)']
```

```
headers_cols = ['age','min_recommended', 'max_recommended',␣
 ↪'may_be_appropriate_min', 'may_be_appropriate_max', 'min_not_recommended',␣
 ↪'max_not_recommended']

# Newborn (0-3)
for i in range(0, 4):
  min_recommended = 14
  max_recommended = 17
  may_be_appropriate_min = 11
  may_be_appropriate_max = 13
  min_not_recommended = 11
  max_not_recommended = 19
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# infants(4-11)
for i in range(4, 12):
  min_recommended = 12
  max_recommended = 15
  may_be_appropriate_min = 10
  may_be_appropriate_max = 11
  min_not_recommended = 10
  max_not_recommended = 18
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# toddlers(12-24)
for i in range(12, 25):
  min_recommended = 11
  max_recommended = 14
  may_be_appropriate_min = 9
  may_be_appropriate_max = 10
  min_not_recommended = 9
  max_not_recommended = 16
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# preschoolers(36-60)
for i in range(36, 61):
  min_recommended = 10
  max_recommended = 13
  may_be_appropriate_min = 8
  may_be_appropriate_max = 9
  min_not_recommended = 8
  max_not_recommended = 14
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])
```

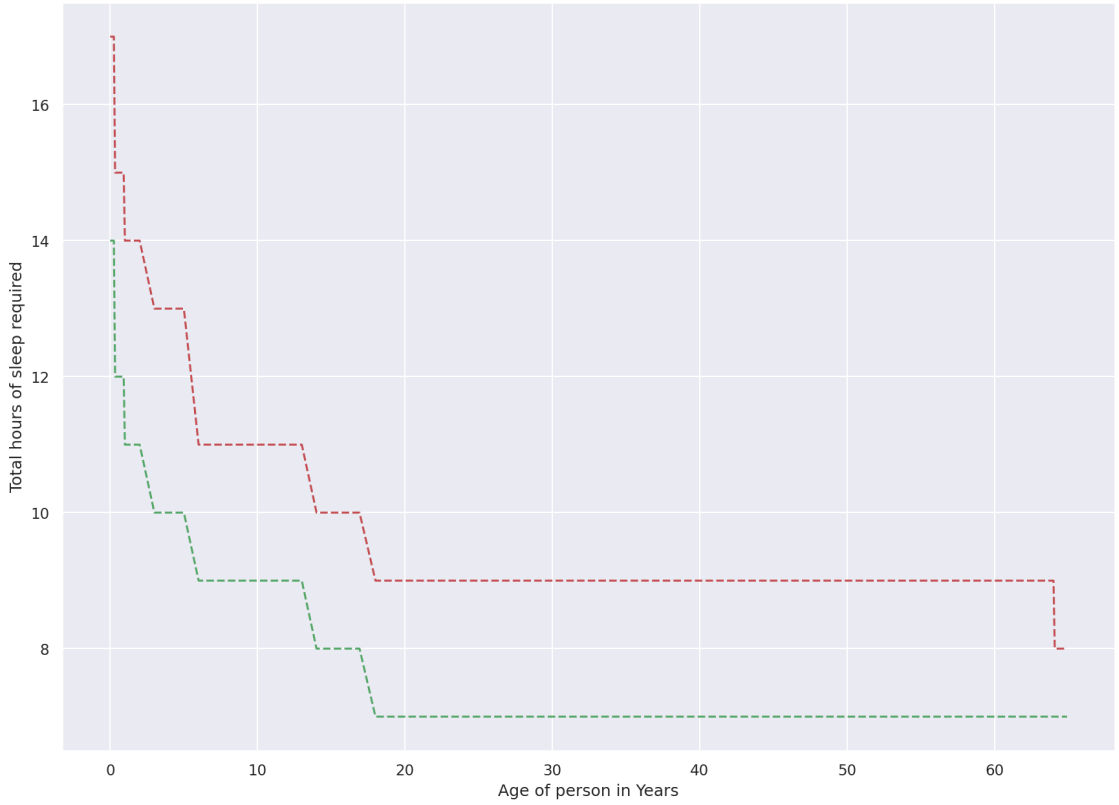
```
# school-aged-children(72-156)
for i in range(72, 157):
  min_recommended = 9
  max_recommended = 11
  may_be_appropriate_min = 7
  may_be_appropriate_max = 8
  min_not_recommended = 7
  max_not_recommended = 12
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# teenagers(168-204)
for i in range(168, 204):
  min_recommended = 8
  max_recommended = 10
  may_be_appropriate_min = 7
  may_be_appropriate_max = 11
  min_not_recommended = 7
  max_not_recommended = 11
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# young-adults(216-300)
for i in range(216, 301):
  min_recommended = 7
  max_recommended = 9
  may_be_appropriate_min = 6
  may_be_appropriate_max = 11
  min_not_recommended = 6
  max_not_recommended = 11
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# adults(312-768)
for i in range(312, 769):
  min_recommended = 7
  max_recommended = 9
  may_be_appropriate_min = 6
  may_be_appropriate_max = 10
  min_not_recommended = 6
  max_not_recommended = 10
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

# older-adults(>=780)
for i in range(769, 780):
```

```
  min_recommended = 7
  max_recommended = 8
  may_be_appropriate_min = 5
  may_be_appropriate_max = 6
  min_not_recommended = 5
  max_not_recommended = 9
  sleep.append([i, min_recommended, max_recommended, may_be_appropriate_min,␣
 ↪may_be_appropriate_max, min_not_recommended, max_not_recommended])

sleepDf = pd.DataFrame(sleep, columns=headers_cols)
sleepDf.head(10)
sleepDf.to_csv(r'sleep_vs_age.csv')
```

[42]:
```
import seaborn as sns
import matplotlib.pyplot as plt
sns.set()

# A regular scatter plot
plt.scatter(x=sleepDf["age"]/12., y=sleepDf["min_recommended"])
plt.scatter(x=sleepDf["age"]/12., y=sleepDf['max_recommended'])
plt.xlabel('Age of person in Years')
plt.ylabel('Total hours of sleep required')
plt.show()
```

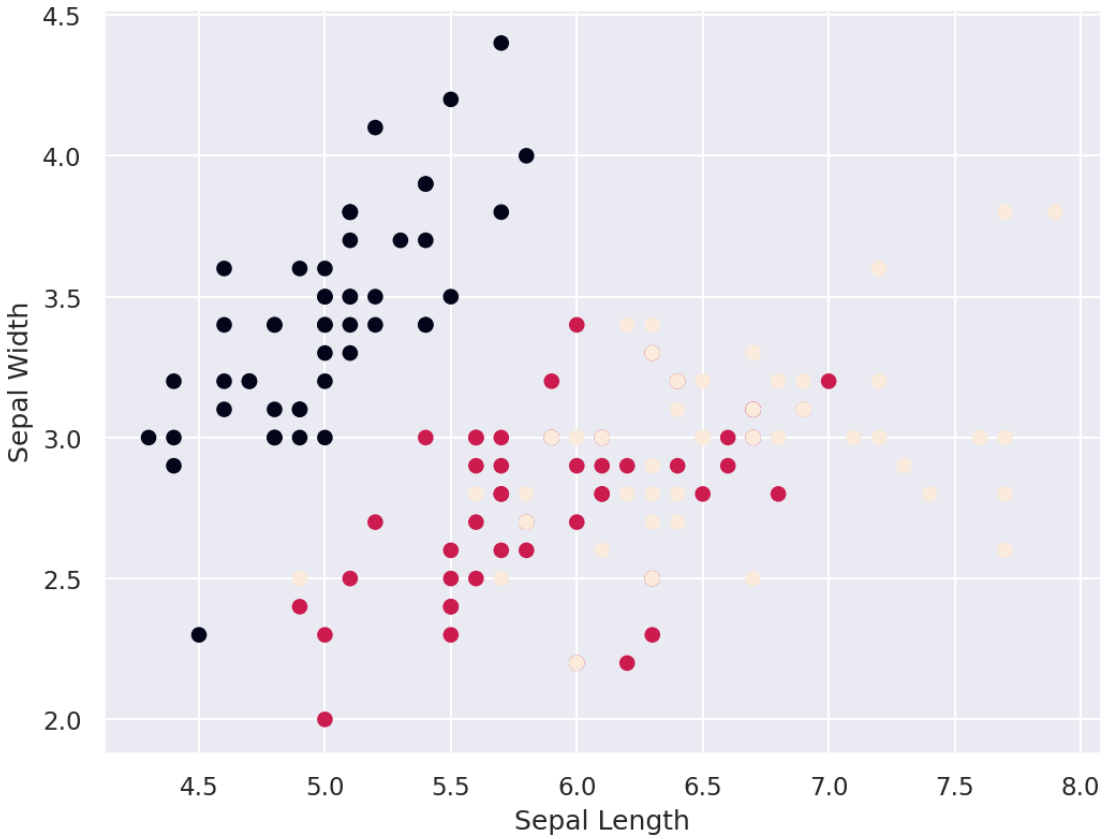


[43]:
```
# Line plot
plt.plot(sleepDf['age']/12., sleepDf['min_recommended'], 'g--')
plt.plot(sleepDf['age']/12., sleepDf['max_recommended'], 'r--')
plt.xlabel('Age of person in Years')
plt.ylabel('Total hours of sleep required')
plt.show()
```



[44]:
```
import seaborn as sns
import matplotlib.pyplot as plt

# Set some default parameters of matplotlib
plt.rcParams['figure.figsize'] = (8, 6)
plt.rcParams['figure.dpi'] = 150

# Use style froms seaborn. Try to comment the next line and see the difference␣
 ↪in graph
sns.set()

# Load the Iris dataset
```

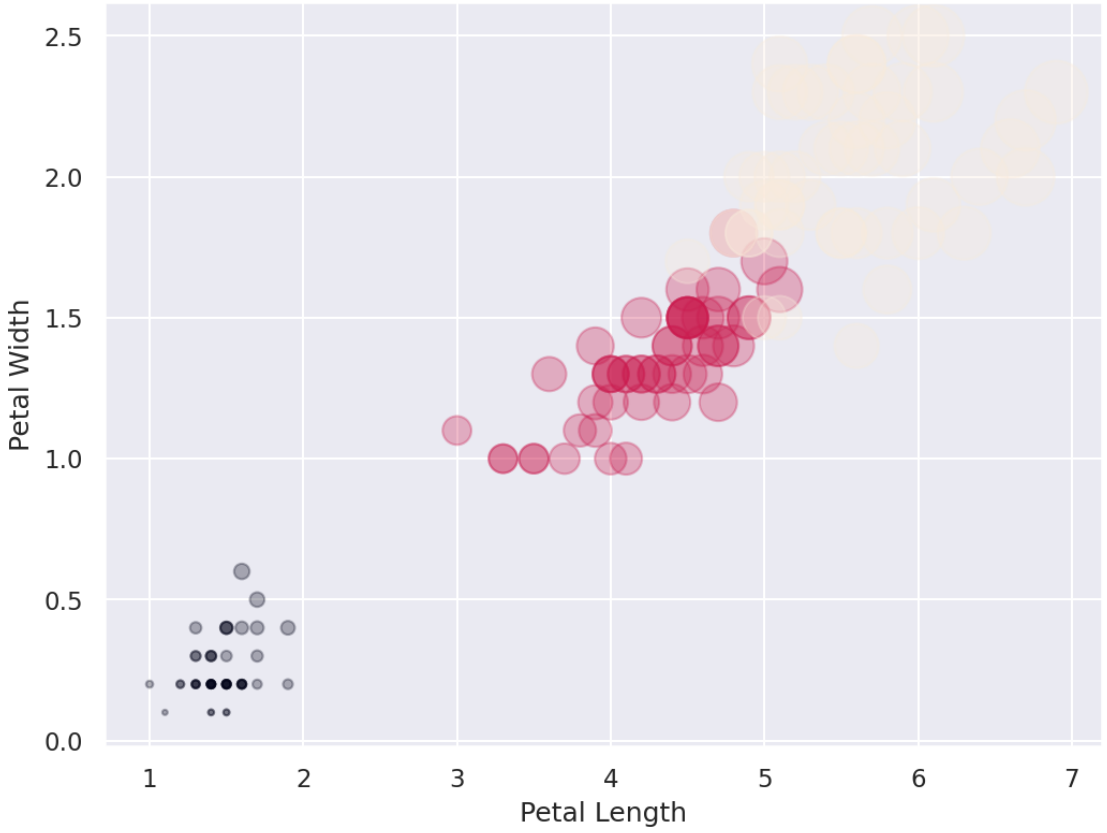
```
df = sns.load_dataset('iris')

df['species'] =  df['species'].map({'setosa': 0, "versicolor": 1, "virginica":␣
↪2})

# A regular scatter plot
plt.scatter(x=df["sepal_length"], y=df["sepal_width"], c = df.species)

# Create labels for axises
plt.xlabel('Sepal Length')
plt.ylabel('Sepal Width')

# Display the plot on the screen
plt.show()
```



5 Bubble plot

A bubble plot is a manifestation of the scatter plot where each data point on the graph is shown as a bubble. Each bubble can be illustrated with a different color, size, and appearance.

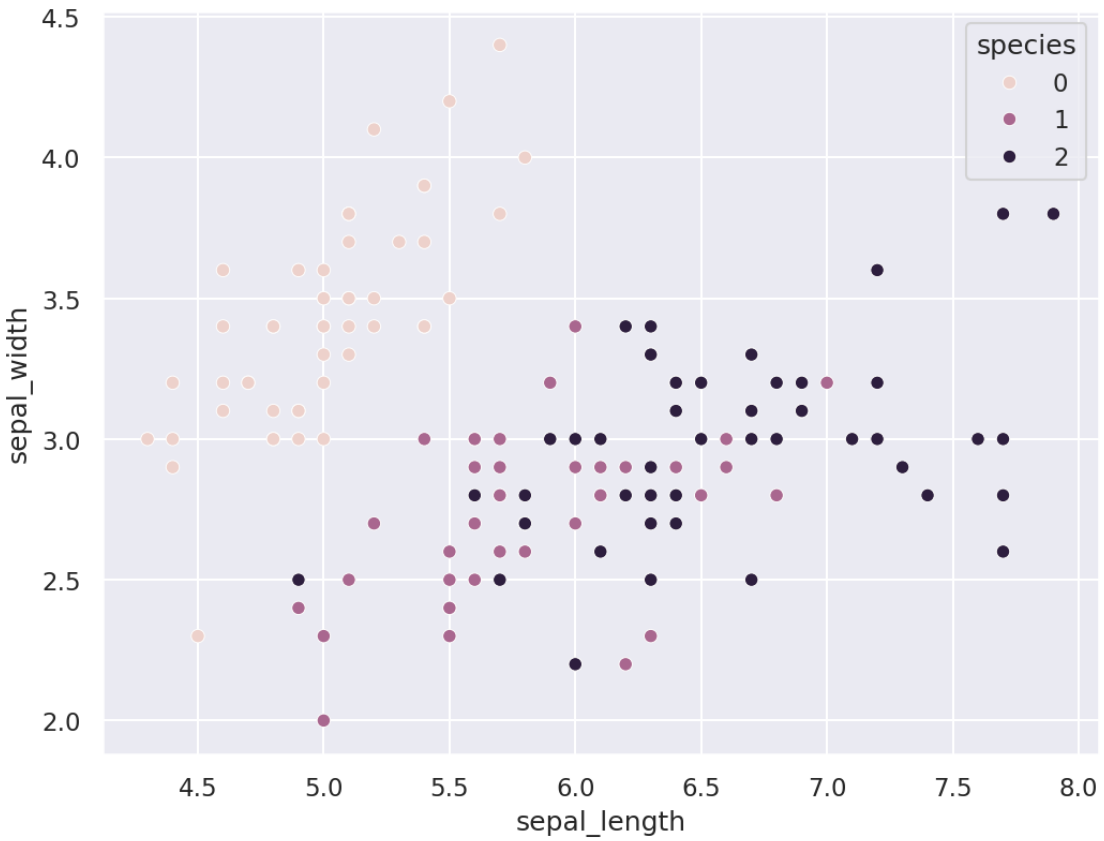
[45]:
```
# Load the Iris dataset
df = sns.load_dataset('iris')

df['species'] =  df['species'].map({'setosa': 0, "versicolor": 1, "virginica":␣
↪2})

# Create bubble plot
plt.scatter(df.petal_length, df.petal_width,
            s=50*df.petal_length*df.petal_width,
            c=df.species,
            alpha=0.3
            )

# Create labels for axises
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```



6 Scatter plot using seaborn

[46]:
```
df = sns.load_dataset('iris')

df['species'] =  df['species'].map({'setosa': 0, "versicolor": 1, "virginica":␣
↪2})
sns.scatterplot(x=df["sepal_length"], y=df["sepal_width"], hue=df.species,␣
↪data=df)
```

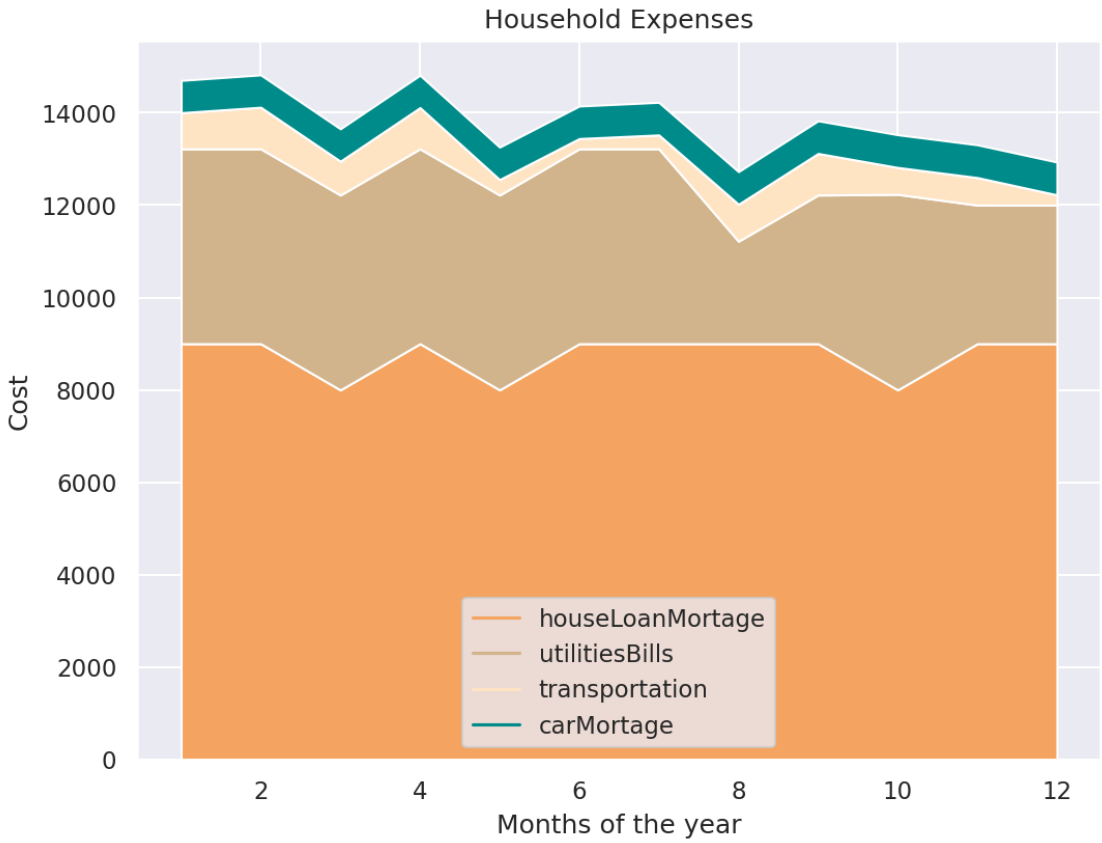
[46]: <Axes: xlabel='sepal_length', ylabel='sepal_width'>



7 Area plot and Stacked Plot

The stacked plot owes its name to the fact that it represents the area under a line plot and that several such plots can be stacked on top of one another, giving the feeling of a stack. The stacked plot can be useful when we want to visualize the cumulative effect of multiple variables being plotted on the y axis

[47]:
```
houseLoanMortage = [9000, 9000, 8000, 9000,
                    8000, 9000, 9000, 9000,
                    9000, 8000, 9000, 9000]
utilitiesBills = [4218, 4218, 4218, 4218,
                  4218, 4218, 4219, 2218,
                  3218, 4233, 3000, 3000]
transportation = [782, 900, 732, 892,
                  334, 222, 300, 800,
                  900, 582, 596, 222]
carMortage = [700, 701, 702, 703,
              704, 705, 706, 707,
              708, 709, 710, 711]


import matplotlib.pyplot as plt
import seaborn as sns

months= [x for x in range(1,13)]

sns.set()
plt.plot([],[], color='sandybrown', label='houseLoanMortage')
plt.plot([],[], color='tan', label='utilitiesBills')
plt.plot([],[], color='bisque', label='transportation')
plt.plot([],[], color='darkcyan', label='carMortage')

plt.stackplot(months, houseLoanMortage, utilitiesBills, transportation,␣
 ↪carMortage, colors=['sandybrown', 'tan', 'bisque', 'darkcyan'])
plt.legend()

plt.title('Household Expenses')
plt.xlabel('Months of the year')
plt.ylabel('Cost')

plt.show()
```



8 Pie chart

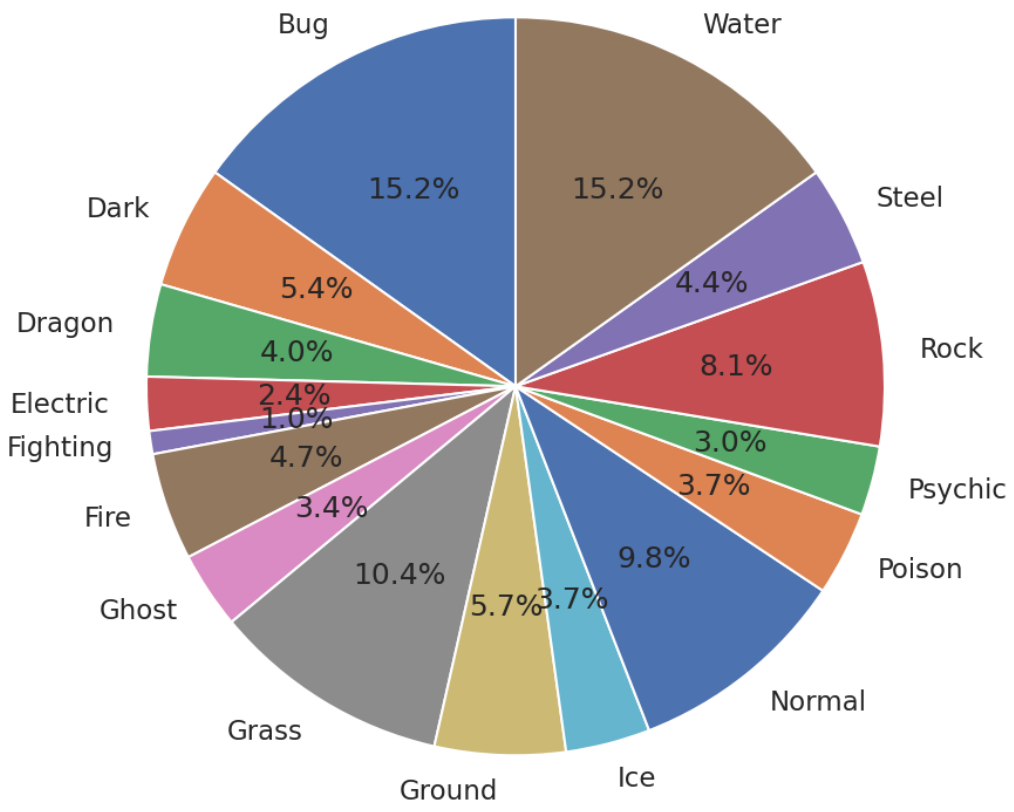
[48]:
```
# Create URL to JSON file (alternatively this can be a filepath)
url = 'https://raw.githubusercontent.com/hmcuesta/PDA_Book/master/Chapter3/
 ↪pokemonByType.csv'

# Load the first sheet of the JSON file into a data frame
pokemon = pd.read_csv(url, index_col='type')

pokemon
```

[48]:

type	amount
Bug	45
Dark	16
Dragon	12
Electric	7
Fighting	3
Fire	14

```
Ghost          10
Grass          31
Ground         17
Ice            11
Normal         29
Poison         11
Psychic         9
Rock           24
Steel          13
Water          45
```

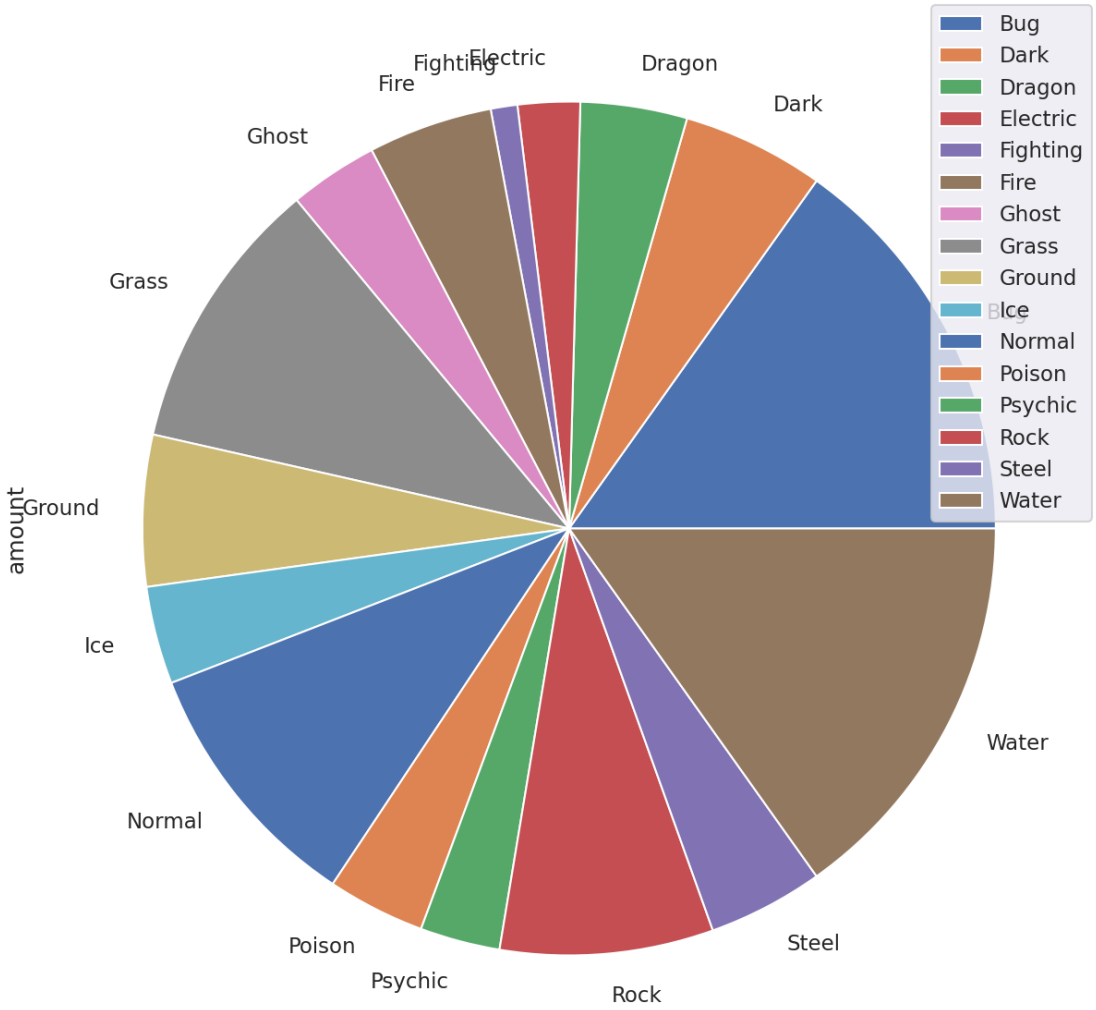
[49]:
```
import matplotlib.pyplot as plt

plt.pie(pokemon['amount'], labels=pokemon.index, shadow=False, startangle=90,␣
 ↪autopct='%1.1f%%',)
plt.axis('equal')
plt.show()
```



Do you know you can directly use Pandas library to create pie chart? Check the one liner below.

[50]:
```
pokemon.plot.pie(y="amount", figsize=(20, 10))
```

[50]:
```
<Axes: ylabel='amount'>
```



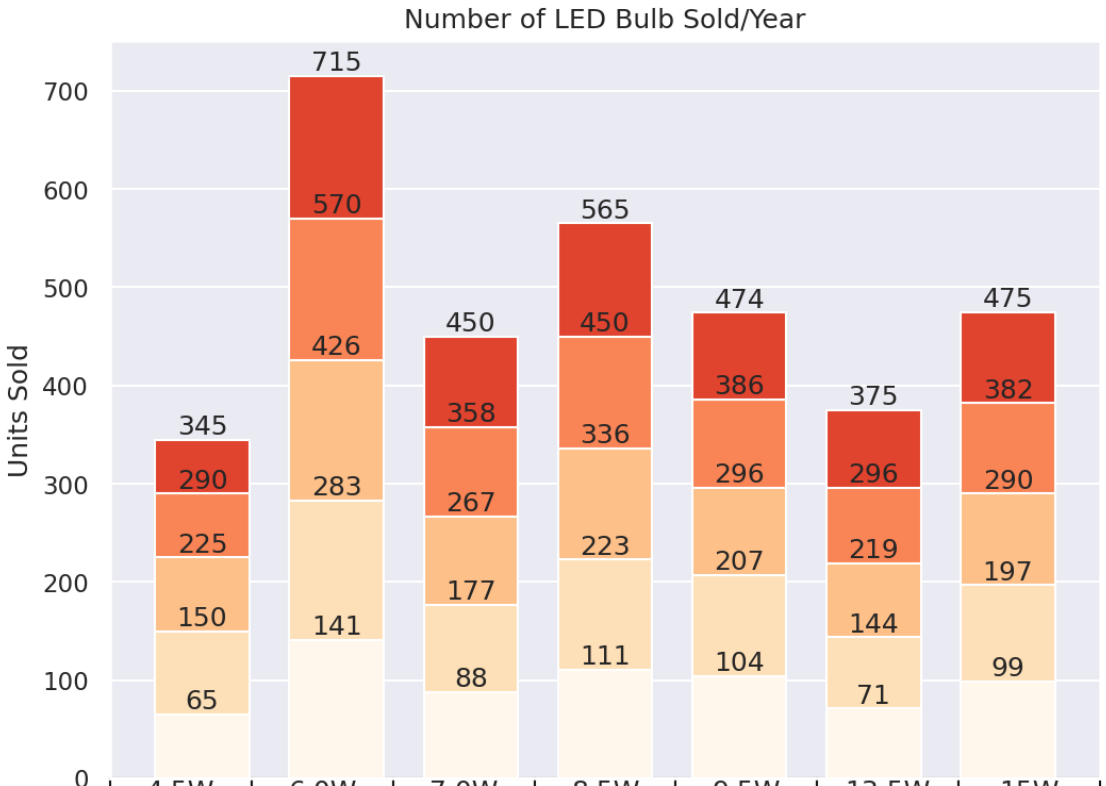
This is why Python is said to be commedian. Do you know why? Because, it has a lot of one liners. Pretty true right?

9 Table Chart

[51]:
```
# Years under consideration
years = ["2010", "2011", "2012", "2013", "2014"]

# Available watt
```

```
columns = ['4.5W', '6.0W', '7.0W','8.5W','9.5W','13.5W','15W']
unitsSold = [
             [65, 141, 88, 111, 104, 71, 99],
             [85, 142, 89, 112, 103, 73, 98],
             [75, 143, 90, 113, 89, 75, 93],
             [65, 144, 91, 114, 90, 77, 92],
             [55, 145, 92, 115, 88, 79, 93],
            ]

# Define the range and scale for the y axis
values = np.arange(0, 600, 100)
```

[52]:
```
colors = plt.cm.OrRd(np.linspace(0, 0.7, len(years)))
index = np.arange(len(columns)) + 0.3
bar_width = 0.7

y_offset = np.zeros(len(columns))
fig, ax = plt.subplots()

cell_text = []

n_rows = len(unitsSold)
for row in range(n_rows):
    plot = plt.bar(index, unitsSold[row], bar_width, bottom=y_offset,
                   color=colors[row])
    y_offset = y_offset + unitsSold[row]
    cell_text.append(['%1.1f' % (x) for x in y_offset])
    i=0
# Each iteration of this for loop, labels each bar with corresponding value for␣
 ↪the given year
    for rect in plot:
        height = rect.get_height()
        ax.text(rect.get_x() + rect.get_width()/2, y_offset[i],'%d'
                % int(y_offset[i]),
                ha='center', va='bottom')
        i = i+1

# Add a table to the bottom of the axes
the_table = plt.table(cellText=cell_text, rowLabels=years,
                rowColours=colors, colLabels=columns, loc='bottom')
plt.ylabel("Units Sold")
plt.xticks([])
plt.title('Number of LED Bulb Sold/Year')
plt.show()
```



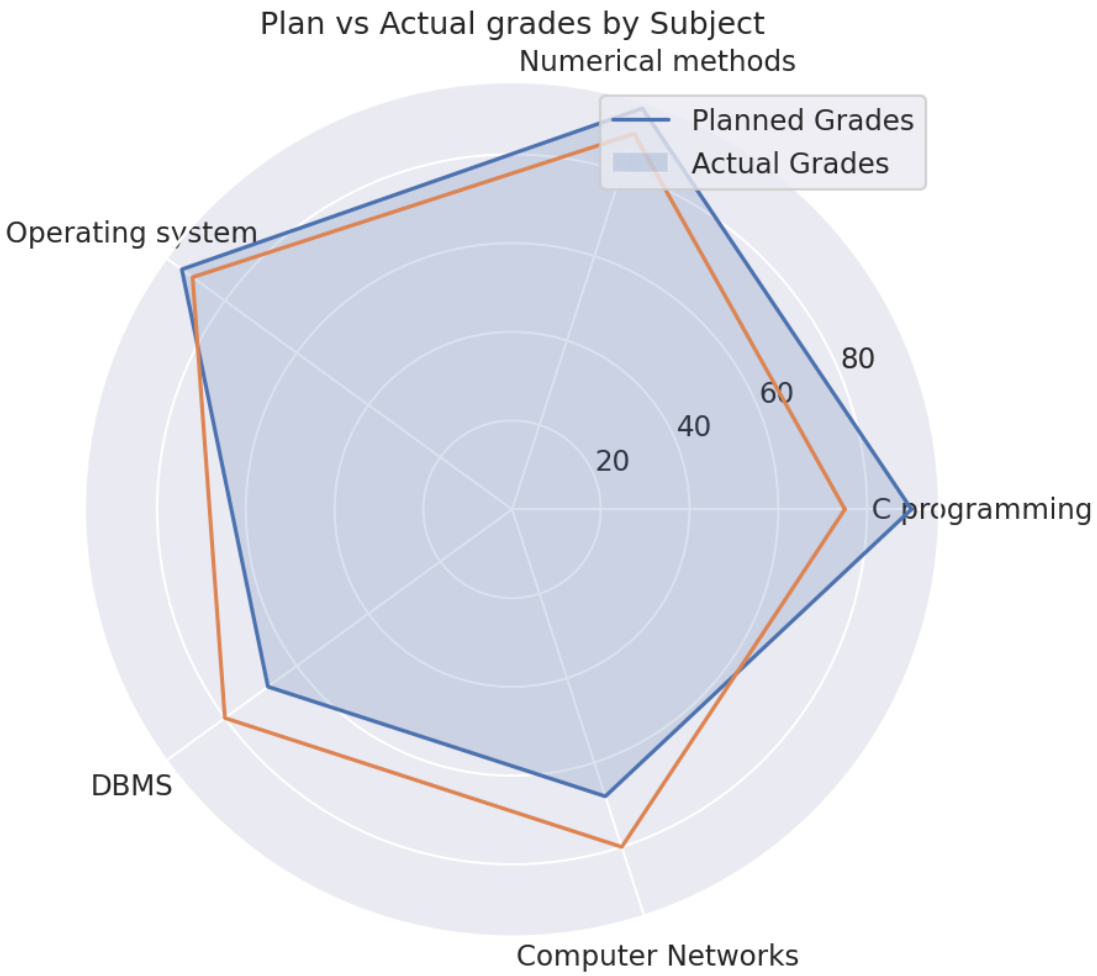
	4.5W	6.0W	7.0W	8.5W	9.5W	13.5W	15W
2010	65.0	141.0	88.0	111.0	104.0	71.0	99.0
2011	150.0	283.0	177.0	223.0	207.0	144.0	197.0
2012	225.0	426.0	267.0	336.0	296.0	219.0	290.0
2013	290.0	570.0	358.0	450.0	386.0	296.0	382.0
2014	345.0	715.0	450.0	565.0	474.0	375.0	475.0

10 Polar chart

a polar chart is a diagram that is plotted on a polar axis. Its coordinates are angle and radius, as opposed to the Cartesian system of x and y coordinates. Sometimes, it is also referred to as a spider web plot.

[53]:
```
# Let us assume you have 5 courses in your academic year.
subjects = ["C programming", "Numerical methods", "Operating system", "DBMS",␣
 ↪"Computer Networks"]

# And you planned to obtained following grades in each subject
plannedGrade = [90, 95, 92, 68, 68, 90]

# However, after your final examination, this is the grade you got
actualGrade = [75, 89, 89, 80, 80, 75]
```

[54]:
```
# 1. Import required libraries
import numpy as np
import matplotlib.pyplot as plt

# 2. Prepare the data set.
# 3. Set up theta

theta = np.linspace(0, 2 * np.pi, len(plannedGrade))

# 4. Initialize the plot by figure size and polar projection
plt.figure(figsize = (10,6))
plt.subplot(polar=True)

# 5. Get the grid lines to align with each of the subject names.
(lines,labels) = plt.thetagrids(range(0,360, int(360/len(subjects))),
                                                (subjects))

# 6. We use plot method to plot the graph. And fill the area under it.
plt.plot(theta, plannedGrade)
plt.fill(theta, plannedGrade, 'b', alpha=0.2)

# 7. Now, we plot the actual grade obtained
plt.plot(theta, actualGrade)

# 8. Finally, we add a legend and a nice comprehensible title to the plot.
plt.legend(labels=('Planned Grades','Actual Grades'),loc=1)
plt.title("Plan vs Actual grades by Subject")

# 9. Lastly, we show the plot on the screen.
plt.show()
```



11 Histogram

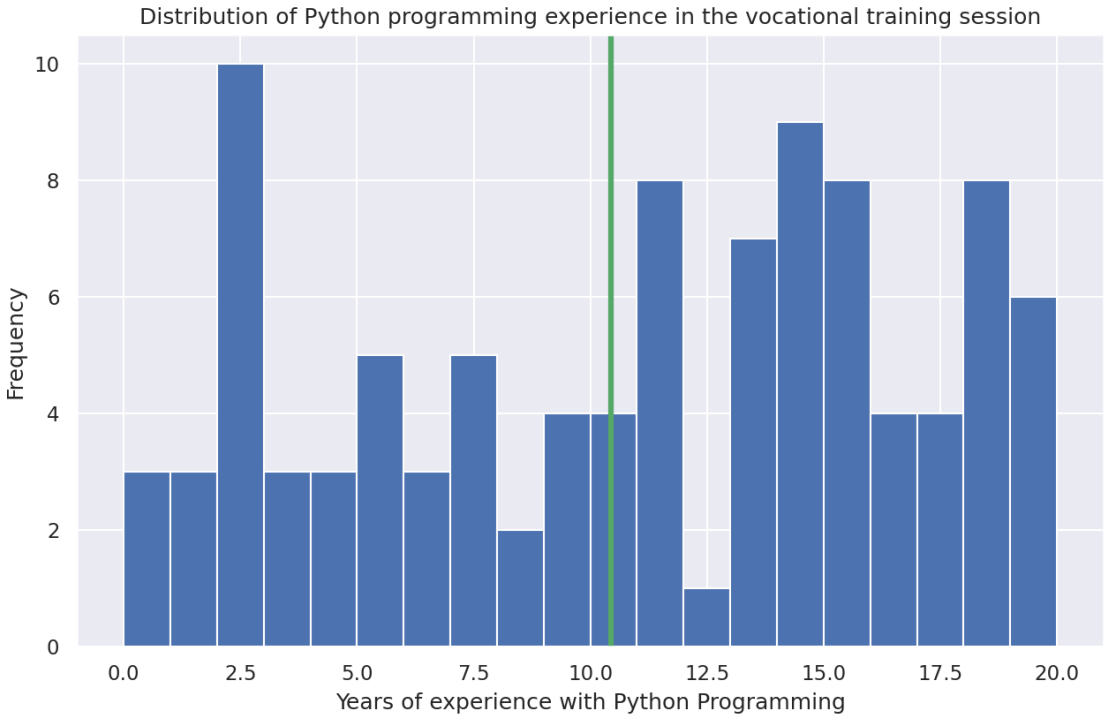
Histogram plots are used to depict the distribution of any continuous variable. These types of plots are very popular in statistical analysis. If you have continuous variables, then a histogram would be a good choice.

[55]:
```
import numpy as np
import matplotlib.pyplot as plt

# 1. Create data set
yearsOfExperience = np.array([10, 16, 14,  5, 10, 11, 16, 14,  3, 14, 13, 19,␣
↪2,  5,  7,  3, 20,
      11, 11, 14,  2, 20, 15, 11,  1, 15, 15, 15,  2,  9, 18,  1, 17, 18,
      13,  9, 20, 13, 17, 13, 15, 17, 10,  2, 11,  8,  5, 19,  2,  4,  9,
      17, 16, 13, 18,  5,  7, 18, 15, 20,  2,  7,  0,  4, 14,  1, 14, 18,
       8, 11, 12,  2,  9,  7, 11,  2,  6, 15,  2, 14, 13,  4,  6, 15,  3,
```

```
       6, 10,  2, 11,  0, 18,  0, 13, 16, 18,  5, 14,  7, 14, 18])
yearsOfExperience
```

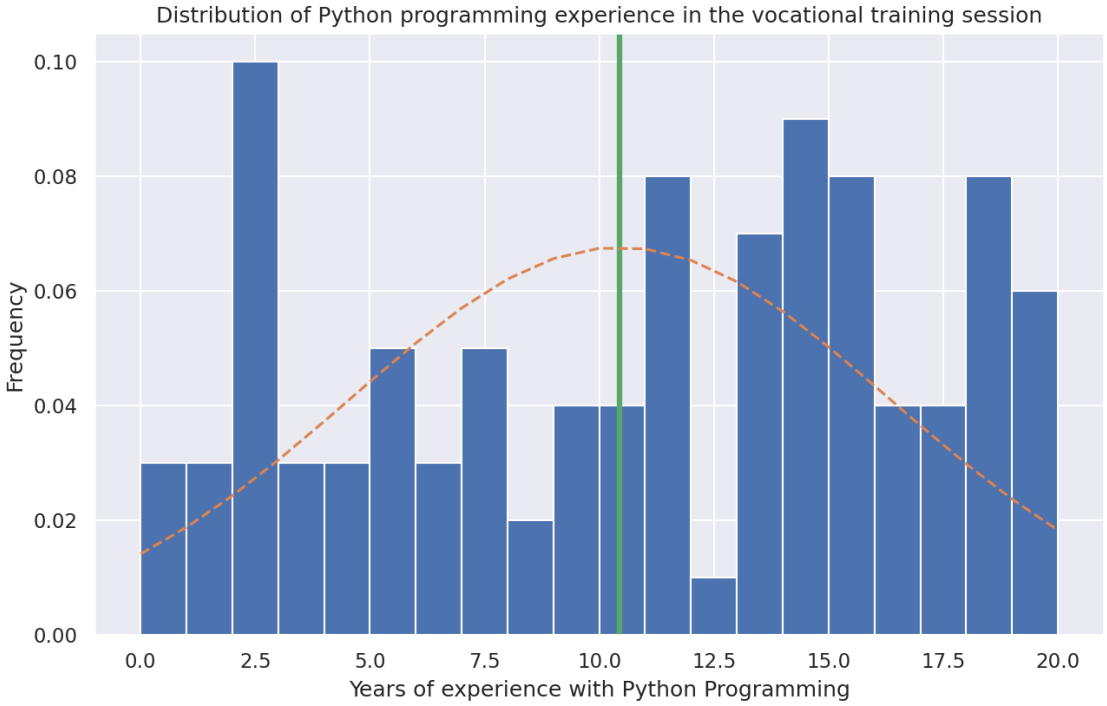
[55]:
```
array([10, 16, 14,  5, 10, 11, 16, 14,  3, 14, 13, 19,  2,  5,  7,  3, 20,
       11, 11, 14,  2, 20, 15, 11,  1, 15, 15, 15,  2,  9, 18,  1, 17, 18,
       13,  9, 20, 13, 17, 13, 15, 17, 10,  2, 11,  8,  5, 19,  2,  4,  9,
       17, 16, 13, 18,  5,  7, 18, 15, 20,  2,  7,  0,  4, 14,  1, 14, 18,
        8, 11, 12,  2,  9,  7, 11,  2,  6, 15,  2, 14, 13,  4,  6, 15,  3,
        6, 10,  2, 11,  0, 18,  0, 13, 16, 18,  5, 14,  7, 14, 18])
```

[56]:
```
plt.figure(figsize = (10,6))

# 2. Plot the distribution of group experience
nbins = 20
n, bins, patches = plt.hist(yearsOfExperience, bins=nbins)

# 3. Add labels to the axis and title
plt.xlabel("Years of experience with Python Programming")
plt.ylabel("Frequency")
plt.title("Distribution of Python programming experience in the vocational␣
 ↪training session")

# 4. Draw a green vertical line in the graph at the average experience:
plt.axvline(x=yearsOfExperience.mean(), linewidth=3, color = 'g')

# 5. Display the plot
plt.show()
```



[57]:
```
plt.figure(figsize = (10,6))

# 2. Plot the distribution of group experience
nbins = 20
n, bins, patches = plt.hist(yearsOfExperience, bins=nbins, density=1)

# 3. Add labels to the axis and title
plt.xlabel("Years of experience with Python Programming")
plt.ylabel("Frequency")
plt.title("Distribution of Python programming experience in the vocational␣
 ↪training session")

# 4. Draw a green vertical line in the graph at the average experience:
plt.axvline(x=yearsOfExperience.mean(), linewidth=3, color = 'g')

# 5. Compute mean and standard deviation of the dataset.
mu = yearsOfExperience.mean()
sigma = yearsOfExperience.std()

# 6. Adding a best-fit line for normal distribution.
y = ((1 / (np.sqrt(2 * np.pi) * sigma)) * np.exp(-0.5 * (1 / sigma * (bins -␣
 ↪mu))**2))
```

```
# 7. Plot the normal distribution
plt.plot(bins, y, '--')

# 8. Display the plot
plt.show()
```

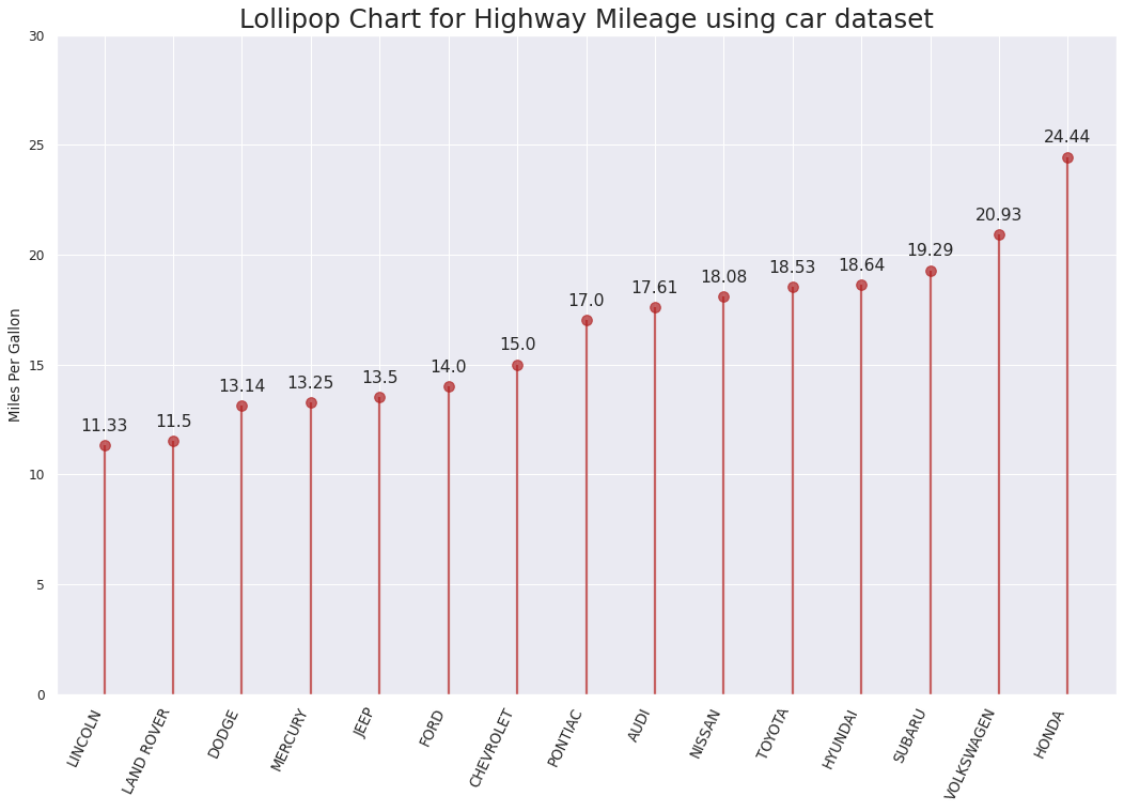


12 Lollipop chart

A lollipop chart can be used to display ranking in the data. It is similar to an ordered bar chart

[58]:
```
# 1. Read the dataset

carDF = pd.read_csv('https://raw.githubusercontent.com/PacktPublishing/
 ↪hands-on-exploratory-data-analysis-with-python/master/Chapter%202/cardata.
 ↪csv')

# 2. Group by manufacturer and take average milage
processedDF = carDF[['cty','manufacturer']].groupby('manufacturer').
 ↪apply(lambda x: x.mean())

# 3. Sort the values by cty and reset index
processedDF.sort_values('cty', inplace=True)
processedDF.reset_index(inplace=True)
```

```
# 4. Plot the graph
fig, ax = plt.subplots(figsize=(16,10), dpi= 80)
ax.vlines(x=processedDF.index, ymin=0, ymax=processedDF.cty, color='firebrick',␣
 ↪alpha=0.7, linewidth=2)
ax.scatter(x=processedDF.index, y=processedDF.cty, s=75, color='firebrick',␣
 ↪alpha=0.7)

# 5. Annotate Title
ax.set_title('Lollipop Chart for Highway Mileage using car dataset',␣
 ↪fontdict={'size':22})

# 6. Anotate labels and xticks, ylim
ax.set_ylabel('Miles Per Gallon')
ax.set_xticks(processedDF.index)
ax.set_xticklabels(processedDF.manufacturer.str.upper(), rotation=65,␣
 ↪fontdict={'horizontalalignment': 'right', 'size':12})
ax.set_ylim(0, 30)

# 7. Write the values in the plot
for row in processedDF.itertuples():
    ax.text(row.Index, row.cty+.5, s=round(row.cty, 2), horizontalalignment=␣
 ↪'center', verticalalignment='bottom', fontsize=14)

# 8. Display the plot on the screen
plt.show()
```


Lollipop Chart for Highway Mileage using car dataset
Miles Per Gallon
0
5
10
15
20
25
30
11.33
11.5
13.14
13.25
13.5
14.0
15.0
17.0
17.61
18.08
18.53
18.64
19.29
20.93
24.44
LINCOLN
LAND ROVER
DODGE
MERCURY
JEEP
FORD
CHEVROLET
PONTIAC
AUDI
NISSAN
TOYOTA
HYUNDAI
SUBARU
VOLKSWAGEN
HONDA

12.1 When to use which chart type

Purpose	Charts
Show correlation	Scatter plot
	Correlogram
	Pairwise plot
	Jittering with strip plot
	Counts plot
	Marginal histogram
	Scatter plot with a line of best fit
	Bubble plot with circling
Show deviation	Area chart
	Diverging bars
	Diverging texts
	Diverging dot plot
	Diverging lollipop plot with markers
Show distribution	Histogram for continuous variable
	Histogram for categorical variable
	Density plot
	Categorical plots
	Density curves with histogram
	Population pyramid
	Violin plot
	Joy plot
	Distributed dot plot
	Box plot
Show composition	Waffle chart
	Pie chart
	Treemap
	Bar chart
Show change	Time series plot
	Time series with peaks and troughs annotated
	Autocorrelation plot
	Cross-correlation plot
	Multiple time series
	Plotting with different scales using the secondary y axis
	Stacked area chart
	Seasonal plot
	Calendar heat map
	Area chart unstacked
Show groups	Dendrogram
	Cluster plot
	Andrews curve
	Parallel coordinates
Show ranking	Ordered bar chart
	Lollipop chart
	Dot plot
	Slope plot